Remarks/Arguments

Claims 1-26 are presently pending in the application. Claims 1, 16, and 17 are presently amended.

Applicant thanks the Examiner for the recognizing that claims 8, 10 and 21 would be allowable if rewritten in independent form to claim all of the features of the base claim and an intervening claims.

Claims 1, 2, 3, 5, and 7 were rejected under 35 U.S.C. 102(b) as being anticipated by Hasegawa (U.S. Pat. No. 6,040,909). This rejection is respectfully traversed for the following reasons.

Hasegawa discloses a surface position detection system to detect the position of a semiconductor wafer for illumination of photosensitive material with an optical circuit pattern. (Col. 3, lines 14-21; Col. 13, lines 37-56.) The surface position detection system replaces the prior art slits (17 and 18 of FIG. 1) with a deformable mirror devices (DMD's)(3 and 14 in FIG. 2A) that can produce "variable slit" patterns. (Col. 5, lines 11-16; Col. 11, lines 17-20.) For example, the DMD may be used to produce the "desired slit patterns" of FIG. 2B-A through FIG. 2B-D. (Col. 4, lines 28-30.) "The mirror [of the DMD] functions as one component for forming a slit image, as a secondary light source. (Col. 6, lines 36-37.) The signal processing circuit 24 detects a position of the wafer based on the interaction of a reflected image with the oscillating mirror 12 and the DMD 14. (Col. 6, lines 59-66 and Col. 7, lines 1-6.)

The measurement positions of the wafer may be selected based on the absence of edges on particular regions of the wafer's surface or on the remoteness of the edges to the measurement positions; such measurement positions are preprogrammed into the main control system 100 for controlling the pattern of the DMD. (Col. 9, lines 31-40.) "If there is a step on the surface to be measured such as a processed wafer .. there occurs an error in the position detection." (Col. 2, lines 45-49.) In addition, the measurement positions on the semiconductor wafer may be selected based at least partially on the pattern of the photomask or reticle. (Col. 8, lines 54-61.)

In contrast to Hasegawa, claim 1 recites a "controlled radiation pattern of a narrower beam size based on a previous lower resolution scan of a greater beam size over a greater area." As shown in FIG. 2B-B through FIG. 2B-D of Hasegawa,

the overall beam comprises multiple slits. Further, in Hasegawa the outer boundaries of the overall beam define a generally uniform matrix size (e.g., 15 x 15 mirror elements) of the DMD pattern. (FIG. 2B-A- FIG. 2B-D.)

Moreover, claim 1 recites a "previous lower resolution scan" to adjust a subsequent resolution or beam size, whereas Hasegawa determines its pattern by selecting measurement locations remote from edges that would otherwise cause errors in the position measurement of the wafer. (Col. 9, lines 31-40; Col. 2, lines 45-49.)

For the foregoing reasons, Applicants respectfully request the withdrawal of the section 102(b) rejection of claim 1. Because claims 2-15 depend upon claim 1, claims 2-15 are patentable for at least similar reasons to claim 1.

Claims 4, 6, 11, 16, 17, 22 and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa in view of Mitsumoto (U.S. Pat. No. 6,611,225). This rejection is respectfully traversed for the following reasons.

Hasegawa was discussed in conjunction with the previous rejection and the description of Hasegawa applies equally to this rejection.

Mitsumoto discloses a radar signal processing apparatus that obtains the relative distance and speed of a target object based on the beat frequency extracted by a first general FFT (Fast Fourier Transform) analysis and a second detailed FFT analysis. (Abstract.) The second detailed FFT analysis is more computationally intensive than the first general FFT analysis. (Abstract.) The radar signal processing apparatus uses a range gate to predict a future relative distance to a target (based on a current relative distance to the target) for the FFT analysis. (Col. 17, lines 29-43.) The radar apparatus appears to use an antenna for receiving a radio frequency or microwave signal, as opposed to an optical device for processing an optical signal. (Col. 1, lines 21-30.)

The sensing system of Hasegawa is designed to determine the position of a wafer for photolithographic semiconductor fabrication, whereas the radar signal processing system of Mitsumoto determines the relative distance or speed of a target based on a FFT evaluation of the beat frequency of radio frequency or microwave signals. Because Hasegawa discloses a fully functional semiconductor fabrication device and Mitsumoto discloses fully functional a radar device, there is no motivation to combine them. Moreover, the cited references do not teach or suggest

how to overcome the technical problem of combining the Hasegawa optical device with the Mitsumoto radio frequency radar device. The radar signal of Mitsumoto cannot be shaped or manipulated to achieve a slit pattern from the DMD device of Hasegawa. Similarly, the position sensing system of Hasegawa does not use a FFT technique analysis of signal processing or estimate the beat frequency analysis to determine the position of a semiconductor wafer. Additional teachings not found in the cited prior art would be necessary to combine Hasegawa and Mitsumoto, and to provide motivation for doing so.

Even if Hasegawa and Mitsumoto could be combined, the alleged combination would not meet claim 1, claim 16 or claim 17. Mitsumoto, alone or in combination, does not make up for the previously referenced deficiencies of Hasegawa with regards to claims 1, 16 and 17, each which calls for "narrower beam size" and "greater beam size" radiation patterns. For example, claim 1 now calls for a "controlled radiation pattern of a narrower beam size based on a previous lower resolution scan of a greater beam size over a greater area." Mitsumoto, alone or in combination, does not reference any beam-forming capabilities of the radar system's antenna or antennas. Mitsumoto merely suggests combining the receive antenna and the transmit antenna into a single antenna. (Col. 1, lines 24-28.) Mitsumoto does disclose any radiation pattern manipulation in Col. 6, lines 25-60 or other beam size adjustment as claimed in claim 1, 16, and 17.

Moreover, Claim 1, claim 16, and claim 17 each call for a "previous lower resolution scan" to adjust a subsequent resolution or beam size, whereas the alleged combination determines its pattern by selecting measurement locations remote from edges that would otherwise cause errors in the position measurement of the wafer (as taught in Hasegawa) or uses a range gate to estimate the future target position based on current target position without any adjustment of beam size whatsoever (as set forth in Mitsumoto).

For the foregoing reasons, applicants respectfully request a withdrawal of the section 103 rejections of claims 1, 16, and 17. Because claims 2-15 depend upon claim 1, claims 2-15 are patentable for at least similar reasons to claim 1. Because claims 18-26 depend upon claim 17, claims 18-26 are patentable for at least similar reasons to claim 17.

To the extent that other rejections of the dependent claims rely on

Hasegawa, alone or in combination, those rejections are deficient for the above noted reasons and Applicants respectfully request their withdrawal.

In conclusion, it is believed that this application is in condition for allowance, and such allowance is respectfully requested. Any fees or charges due as a result of filing of the present paper may be charged against Deposit Account 04-0525. Two duplicates of this page are enclosed.

Respectfully,

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